

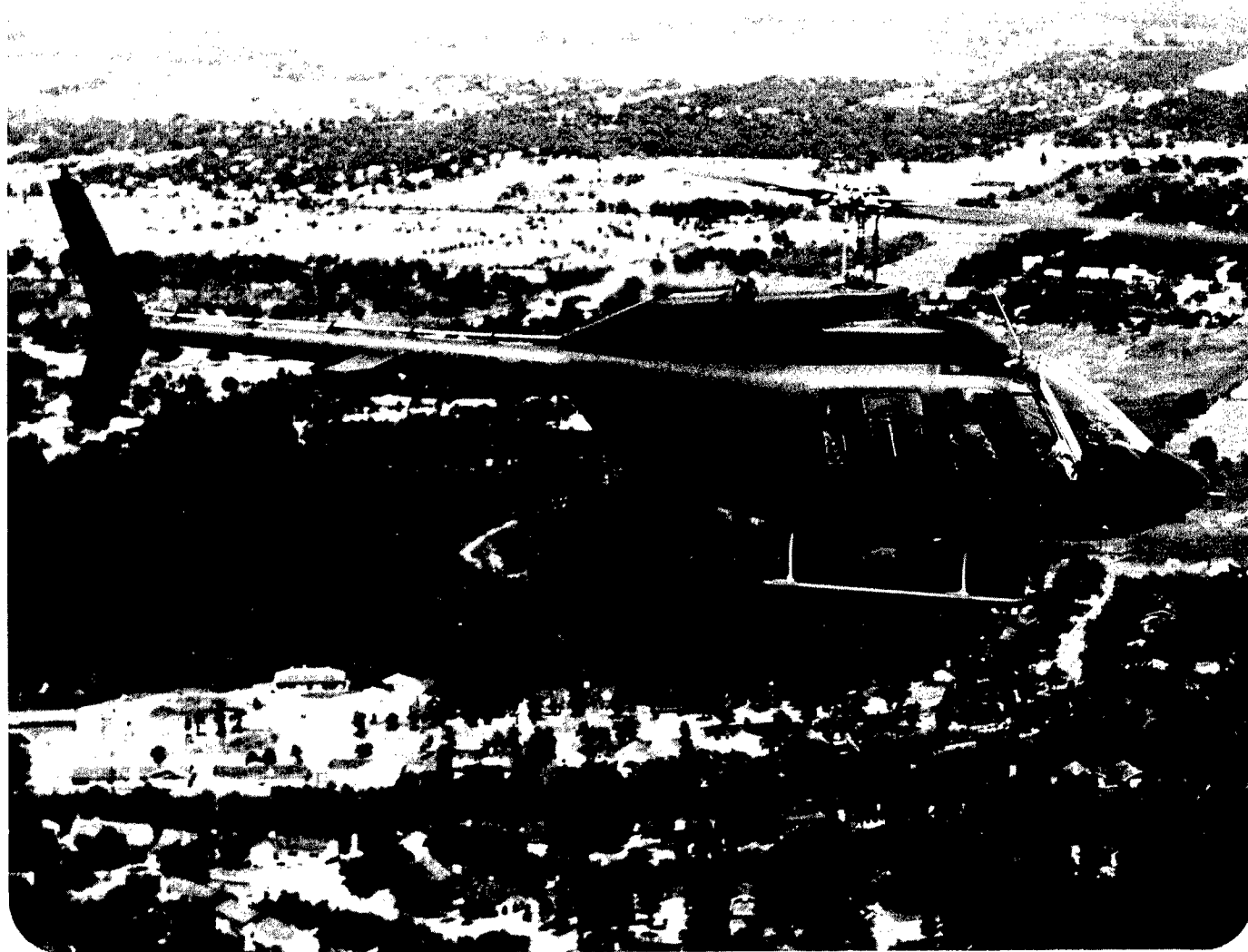
PREPARED BY THE UNITED STATES ARMY BOARD FOR AVIATION ACCIDENT RESEARCH

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MAJORS, INCIDENTS, FORCED LANDINGS, PRECAUTIONARY LANDINGS

OH-58 ACCIDENT SUMMARY

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OH-58 ACCIDENT SUMMARY

May 1969 through February 1971

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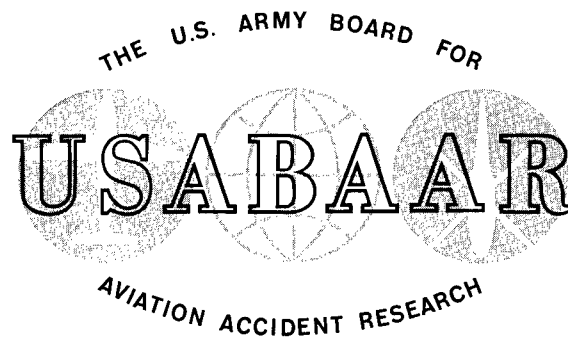
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FOREWORD

As evidenced by the accident cause factors contained in this summary, crew error remains Army aviation's number one enemy, with materiel failure ranking second. If Army aviation is to be totally effective, we cannot and must not allow our manpower and materiel to be depleted by needless losses due to these cause factors. Therefore, commanders and supervisors must make a concerted effort to curb losses by continuously emphasizing the need for professionalism on the part of all aviation-related personnel and by using the available avenues for preventing accidents which include past mishap experience, prevention surveys, and AR's 95-5 and 385-40.

Since OH-58 accident cause factors are not necessarily peculiar to this type aircraft, they afford all aviation-related personnel an opportunity to learn from past experience and aid commanders and supervisors in pinpointing those areas where increased emphasis is needed.

Therefore, I ask you to review this summary carefully, weigh its contents, combine your experiences with that of others, and then do your share in implementing and supporting a more effective accident prevention program.

Let us hope that future OH-58 accident summaries will reveal the efforts of each team member in reducing accidents and personnel injuries.

EUGENE B. CONRAD
Colonel, Infantry
Director

OH-58 ACCIDENT SUMMARY

MAY 1969 THROUGH FEBRUARY 1971

INTRODUCTION. This summary was prepared to aid commanders, aviation safety officers, maintenance officers, aviators, and related aviation personnel in accident prevention and the preservation of combat resources through a review of past OH-58 mishaps and their cause factors. The term "mishap" includes accidents, incidents, forced landings, and precautionary landings as defined in paragraph 2-8, change 2, AR 385-40, dated 24 November 1970. Aircraft losses or damages which were the direct result of hostile action in RVN are not included.

SYNOPSIS. The OH-58 was involved in 202 mishaps since its introduction into the Army inventory in May 1969 through 28 February 1971. There were 29 major accidents of which 12 were total losses, 38 incidents, 29 forced landings, and 106 precautionary landings. Based on total OH-58 flying hours (235,072) during this 21-month period, the accident rate per 100,000 flying hours was 12.3. Of the 279 crewmembers involved in all mishaps, 17 received fatal injuries and 15 received nonfatal injuries. Damage was incurred in 67 of the 202 mishaps, costing approximately \$1,674,000.

Crew error and materiel failure were the cause factors responsible for all accidents and incidents, with supervisory error apparent in the majority of the mishaps. Crew error consisted of flying into known or predicted instrument meteorological conditions (IMC), tree and wire strikes, IP complacency, and poor pilot judgment. Materiel failure was primarily attributed to engine failure, with antitorque failure ranking second.

CONCLUSIONS. Crew error mishaps were the most costly in personnel injury and damage

cost. The losses incurred from tree and wire strikes, flight into known or forecast instrument conditions, failure to brief passengers, and crewmember complacency can be reduced by learning from past experience of others. Commanders and supervisors must emphasize and re-emphasize the results of crew error mishaps. Furthermore, command supervision is required to insure that an adequate transition program is in effect, that proper maintenance procedures are followed, and that protective clothing and equipment are procured and used.

Numerous changes in design and materiel have been accomplished as a result of promptly reporting materiel failures and design deficiencies through the Equipment Improvement Report (EIR) Program. Continued participation in this program will insure that the necessary changes are made. Through the efforts of each member of the aviation team, the number of materiel failure type mishaps can be reduced.

DISCUSSION. Figure 1 depicts graphically, by cause, 67 of the 202 OH-58A mishaps in which damage was incurred. As can be readily seen, crew error caused the preponderance of these 67 mishaps in which 17 fatalities and 15 injuries occurred. Crew error was listed as the cause factor in all of the fatal accidents and in 22 of the 37 incidents. Except for one injury, all injuries and fatalities occurred in the major accidents.

A review of the OH-58 mishap briefs presented in this summary reveals certain basic crew errors. These errors, discussed below, can for the most part be avoided if there is a concerted effort on the part of commanders and

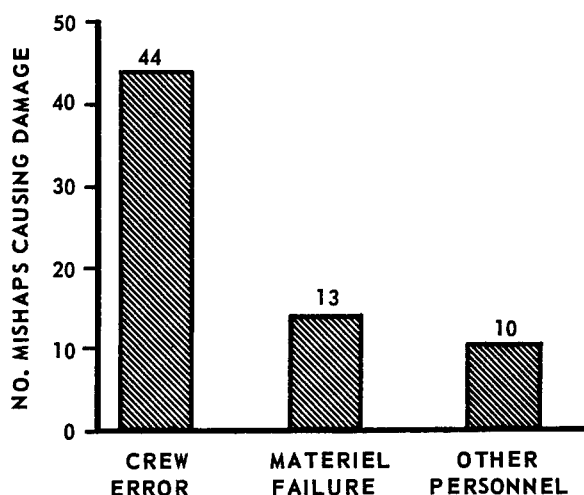


FIGURE 1
OH-58A Mishaps Resulting In
Damage Shown By Cause Factors

supervisors at all levels to maintain a continuous educational program in this area.

Flight into known or forecast IMC. The OH-58A is not designed for instrument flight and therefore should never be flown into known or predicted IMC. Yet, in this reporting period, four accidents attributable to this error resulted in 11 fatalities and one injury. Proper flight planning, good judgment, and awareness of personal and equipment limitations are factors which can help to preclude this error. These factors must be emphasized at all command and supervisory levels.

Complacency during low-level flight. Tree strikes and wire strikes are an inevitable consequence of an aircrew's failure to watch where the aircraft is going. The consequences are often catastrophic. During this reporting period two wire strikes resulted in five fatalities and total aircraft losses. Eight of the 22 crew error incidents resulted from tree strikes. Familiarity breeds contempt, and the frequency of low-level flight dictated by the observation mission may indeed breed contempt in the form of pilot complacency. The aviator must realize that low-level flight leaves very little margin for error and that he must be alert at all times. Wires and trees do not grow suddenly, and they can be avoided if the aviator watches where he is going instead of where he has been. In addition, gauges take on added significance during low-

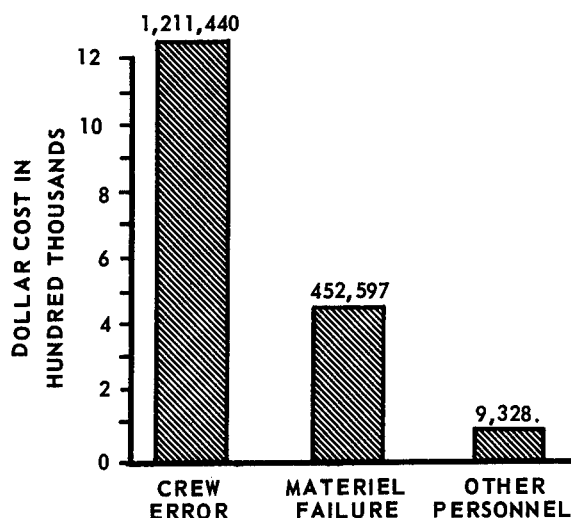


FIGURE 2
Mishap Costs

level flight as time available for reaction to malfunctions or emergencies is minimal.

IP Complacency. Four of the crew error incidents occurred during autorotation training. An IP cannot prop up his feet and relax no matter how good the pilot next to him seems to be. The student is not responsible for the aircraft and he can make a mistake during any maneuver which requires immediate corrective action to avoid an accident. An IP must always be alert and ready to take charge of the aircraft. It must be noted, however, that this figure is low considering the fact that the OH-58A was in its development, test, and initial transition phase.

Continued command and supervisory emphasis on an error-prevention campaign will be necessary to reduce and, it is hoped, eliminate mishaps of this sort. Further, if each aviator will evaluate his situation carefully and exercise good judgment, crew error can be substantially reduced. Complacency has been plaguing aviation since its earliest days. If each flight is treated as a hazardous mission, fewer accidents will happen. An attitude of "No sweat, this is a routine mission," jeopardizes both crew and aircraft. Too many routine missions have had very unusual and often fatal endings.

Figure 2 depicts the cost breakdown of the 67 mishaps by cause factors. Although secondary in significance by far to the loss of life, the loss in dollars sustained in both the fatal and

nonfatal mishaps is staggering. The OH-58A mishaps reported during this period cost the taxpayer approximately \$1,674,000. About 72 percent of this cost, or about \$1,212,000, was incurred in crew-error caused mishaps.

Command supervision, although not listed by accident investigation boards, played its part in these accidents. Insuring that flight crews properly plan their flight, that the experience level of the aviator is considered in the assignment of the mission, and that proper flight clothing and protective equipment is made available and worn are all command responsibilities. The aviator is on his own once the aircraft leaves the ground. However, commanders must insure that proper maintenance has been performed on the aircraft, that the pilot is qualified to fly the aircraft, and that weather and difficulty of the mission have been considered.

It follows, then, that for both humane and financial reasons, the Army must continue to promote a campaign aimed at reducing to the minimum any mishaps caused by crew error. The responsibility for the conduct of a successful campaign lies with each commander and supervisor.

Materiel failure caused the second-highest number of mishaps (13 of the 67) which resulted in damage. Mishaps from this cause fortunately resulted in no fatalities. Engine failure caused most of the mishaps, with antitorque failure ranking second. Cost in dollars was about \$453,000. Faithful reporting of all materiel failures through the Equipment Improvement Report (EIR) Program is the major weapon available in the fight to reduce mishaps attributable to this cause. Wholehearted participation in this program is a mark of professionalism and is again the responsibility of the commander and the supervisor.

Inadequate passenger briefing was directly responsible for the majority of "other personnel" cause-factor mishaps. In four incidents, the front-seat passenger raised the collective instead of the armor seat release, and the pilot could not recover in time to prevent a hard landing. This error on the part of the passenger points up the vital requirement of a good passen-

TABLE 1
Accident and Frequency Rate Per 100,000 Flying Hours

TYPE MISHAP	TOTAL NUMBER	ACDT. RATE PER 100,000 HOURS	FREQ. RATE PER 100,000 HOURS
ACCIDENTS	29	12.3	
INCIDENTS	38		16.2
F/L	29		12.3
P/L	106		45.1
TOTAL	202		

ger briefing. This briefing is the aviator's responsibility. The passenger, especially if he is nonrated, cannot be expected to know what problems he can create by improper entry into or exit from an aircraft, by failure to secure objects that could be pulled through the main or tail rotor, or by panicking during an emergency. If five minutes of the pilot's time are required to brief each new passenger, it is time well spent to prevent aircraft damage or personnel injury should a malfunction occur in flight.

The 202 OH-58A mishaps reported during this 21-month period occurred during 235,072 flying hours. Table 1 shows the accident and frequency rate per 100,000 flying hours.

Selected Major Accident Briefs

70032109--Engine failed during right turn and the aircraft lost altitude. Pilot applied collective, but the aircraft failed to respond. He continued to pull pitch and, just prior to impact, leveled the aircraft and applied aft cyclic to flare. The main rotor blades struck a tree, severing the rotor head from its mast, the tail boom aft of the stabilizer, and the right skid. Caused by pilot failing to take corrective action after engine failure. Cause of engine failure is unknown pending results of teardown analysis.



70032109 - Pilot failed to take corrective action after engine failed.

70040902--During low-level flight in a valley under conditions of rain, snow, and fog, aircraft struck powerlines and crashed. The pilot and observer were fatally injured and the aircraft was destroyed by postcrash fire. Caused by flying at unnecessarily low altitude and high airspeed for mission accomplishment, and failing to respond to warning of imminent wire dangers. Probable or suspected cause factors were (1) improper supervision within the unit of flight planning procedures and disregard of basic safety regulations, and (2) false impression on the part of the pilot that the powerlines ran parallel to the intended route of flight.



70040902 - Pilot failed to respond to warning of imminent wire dangers.

70070416--Pilot entered IFR conditions while flying through a pass. He made a right-hand turn, increased airspeed, and made a rapid nose-low descent. The aircraft broke out of the clouds in an approximate 30-degree nose-low attitude with 80 knots airspeed and struck the sea. Both the pilot and passenger suffered minor injuries. However, the pilot drowned due to his inability to swim and lack of life preservers or sea survival equipment. The aircraft was a total loss. Caused by pilot failing to avoid a storm and unsuccessfully executing inadvertent IFR procedures. Suspected factors were that pilot failed to use a checklist during preflight and to uncage the attitude indicator and that he possibly experienced vertigo.

70070716--During a demonstrated low-level 80-knot autorotation, IP applied initial collective pitch at 10 feet agl. The aircraft descended vertically at a high rate of speed and struck the ground hard in a level attitude, damaging the tail boom and tail rotor drive shaft. Caused by IP using improper technique to terminate autorotation. Probable or suspected factors were (1) lack of knowledge by IP of the effect of density altitude on the aerodynamic characteristics of the OH-58, and (2) probable tail boom failure due to exceeding aircraft design limitations.

70071402--During a training mission, the IP initiated a simulated forced landing. Realizing that the SP was not going to reach the forced landing area, the IP assumed control at 150 feet and attempted a power recovery, but the engine failed to respond. He then turned the aircraft toward an alternate landing area and the aircraft touched down in a swampy area in a skids-level attitude. IP was unable to control the aircraft heading with the pedals. The aircraft turned slightly to the right and rolled on its left side, breaking the main rotor blades, left cargo door window, and chin bubble, and denting the left side of the fuselage. Caused by initiating a simulated forced landing at low altitude.

70081708--During a straight-in practice autorotation, the SP applied excessive pitch at a high altitude, resulting in a critical loss of rotor rpm and a high sink rate. In an attempt to level the aircraft, he put the aircraft in a nose-low attitude. Unable to initiate a power recovery, the IP applied aft cyclic and landed hard on the back of the skids, wrinkling the skin on the tail boom, and popping the rivets on the main rotor blades. Caused by IP failing to take proper and timely corrective action and by the SP applying initial pitch at high altitude.

7011-12-68-16962

70111325--While flying at 40 to 50 feet agl and 20 knots, pilot sighted a bunker. He applied hard right pedal to swing around on the bunker position. The aircraft continued to turn right and application of left pedal failed to correct the turn. The aircraft began to settle into the trees and pilot applied forward cyclic and right pedal and lowered pitch. The aircraft continued to settle and pilot centered the cyclic and pulled pitch to cushion the impact. The main rotor blade struck the trees and the aircraft struck the ground, damaging the transmission, main rotor, main rotor blades, and skids. The observer had minor contusions of the left arm. Caused by applying right pedal at low altitude and airspeed, causing aircraft to assume a tail high attitude.

70120408--Pilot was flying through a pass in which marginal to IFR conditions had been reported with a ceiling less than 100 feet and

visibility less than one-quarter mile with rain, haze, and clouds. He made a turn-around to return to the departure point and the aircraft struck a mountain at 2400 feet. The pilot and three passengers were fatally injured and the aircraft was destroyed. Caused by pilot using poor judgment in entering a known area of marginal weather and thereby experiencing inadvertent IFR conditions.

70121806--On approach to landing zone, pilot descended to 200 feet with 80 knots airspeed. Having no visual indication of the wind velocity, he dropped a grenade, diverting his attention from inside the cockpit. Looking to his front again, he noticed a 20- to 30-foot tree. He made a climbing left turn, but the aircraft struck the tree and the nose pitched forward, damaging the main rotor blades, nose section, tail fin, and right center section. The pilot, realizing tail rotor control had been lost, made a tail rotor failure landing without further damage. There were no injuries. Caused by failure of pilot to maintain visual clearance and separation from the highest obstacle during low reconnaissance.

70123010--Pilot was flying at 1,200 feet behind an AH-1G en route to a refueling area. The OH-58A pilot notified the AH-1G pilot that he was switching frequencies to contact headquarters. This was the last communication between the pilots. For reasons unknown, the pilot entered a cyclic dive of 20 to 30 degrees to descend to a low altitude. Ground witnesses saw the aircraft strike high tension lines at approximately 75 feet above the ground. The aircraft crashed and burned. The three personnel aboard the aircraft were fatally injured. Because of the nature of this accident, no established cause factors were determined by the investigation board. A suspected factor was that pilot failed to observe high tension lines while attempting to fly low level.

71012813--Pilot was on a low-level training mission. After 15 to 20 minutes of flight, he made a climbing turn coming from behind a ridge-line and the aircraft struck high tension wires, causing loss of antitorque control. He autorot-



71012813 - Pilot became disoriented and struck the trees.

tated from low altitude prior to entering trees. The aircraft descended through the trees and crashed on rocks in a streambed in a ravine, damaging the main rotor blades, right skid, vertical stabilizer, tail rotor gearbox, airframe, and skin. The pilot and two passengers suffered minor injuries. Caused by pilot disorientation. Contributing factors were (1) unapproved area for contour flying and (2) possible complacency.

Selected Incident Briefs

69092921--Minigun barrel ruptured, allowing rounds to exit side of barrel. Approximately 50 rounds entered the aircraft, causing incident damage to the main rotor blades.

70032427--On termination of autorotation, excessive pitch pull caused a hard landing, damaging the left skid.

70043024--Pilot inadvertently went IFR and aircraft struck a tree, damaging the main rotor blades.

70052908--Pilot was hovering from refueling pad. Right skid entangled in grounding cable and aircraft landed hard on one skid.

70060112--During hover, passenger hit collective, moving it downward, and resulting in hard landing and incident damage.

70070414--Main transmission chip detector came on during takeoff. Aircraft hit wires on landing, damaging the tail stinger. Caused by metal particle on chip detector light.

70071807--Aircraft was landed from a hover in front of a 10-foot high fixed wing revetment. The pilot leveled the rotor blades, causing the rotor blade tips to strike a protruding engineer stake.

70072607--Back seat cushion blew out of aircraft, damaging the tail rotor.

70083109--Aircraft struck tree during a sharp right turn, damaging chin bubbles and cowling.

70122502--Left skid of aircraft caught in PSP, damaging the skid.

Selected Forced Landing Briefs

69091013--Chip detector light came on, followed by loud noise and power loss. Pilot autorotated. Caused by oil starvation due to check valve external oil supply line being installed backwards.

70062208--No. 1 hydraulic system failed in flight. Caused by low-side governor failure.

70082814--Torque fluctuated between 40 and 50 psi and engine failed. Caused by contaminated fuel.

70083102--Pilot heard popping noise and aircraft yawed gently to left. Caused by failure of 5th and 6th stage compressor blades.

70120204--RPM fluctuated and then went to zero. Caused by failure of fuel control.

Selected Precautionary Landing Briefs

69070312--Tail rotor chip detector light came on. Caused by metal chip on plug.

69070302--Transmission pressure warning light came on. Caused by failure of transmission oil pressure switch.

69091813--Engine surged and torque fluctuated between 15 and 50 psi, affecting directional control. Caused by failure of the fuel control.

69102314--Engine surged, causing aircraft to yaw.

69112008--On approach to landing, pilot heard loud noise from rear of aircraft and made a power-on landing. Caused by failure of oil cooler blower assembly.

70020914--Tail rotor chip detector light came on. Caused by fuzz on detector plug.

70021706--Engine chip detector light came on. Caused by metal flake on plug.

70041012--Engine oil pressure rose rapidly to 150 degrees. Caused by failure of temperature transmitter.

70041628--Pilot experienced an extremely high frequency vibration during practice autorotation. Caused by failure of oil cooler impeller fan.

70042035--On approach to landing, engine oil pressure went to zero, engine-out warning light came on, and engine continued to run as pilot terminated with power. Engine deck and airframe were covered with oil. Caused by failure of tube assembly.

70042920--Master caution and hydraulic lights came on and hydraulic pressure was lost. Caused by failure of hydraulic pump.

70070709--Inverter fuel boost pump and generator caution lights came on. Caused by failure of voltage regulator.

70072814--During takeoff, pilot noted slight vibration and aborted the flight. Caused by drag pin failure.

70081006--Pilot experienced hydraulic failure. Caused by failure of seal around pressure switch.

70100809--AC heard metal-to-metal contact. Caused by failure of No. 4 hanger bearing.

70110610--Transmission oil light came on due to a shorted wire.

70112707--Engine oil by-pass caution light came on. Pilot brought aircraft to hover and the light stayed on. Oil pressure dropped to zero. Caused by failure of No. 2 bearing seal.

71010208--During flight, tail rotor vibrated. Caused by loose trunnion bolt.

71021110--Pilot heard loud noise in engine compartment and engine oil pressure dropped. Caused by disintegration of impeller fan.

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